AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all previous claims and listings in the application.

1. (Currently amended) A method of preparing a sample for mass spectrometry analysis, comprising

a) obtaining a sample comprising an analyte, wherein said analyte comprises an exposed group; and

b) reacting said analyte with a triarylphosphonium labeling reagent having a reactive group capable of reacting with said exposed group to thereby form a triarylphosphonium-linked analyte ~~according to the Formula~~

~~$[Ar_3P^+R]X^-$~~

~~wherein~~

~~each Ar is an aryl group, all of which may the same or different;~~

~~P is a phosphorous atom;~~

~~R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond, thereby linking said analyte to the triarylphosphonium group of the labeling reagent; and~~

~~X^- is a negatively-charged counter ion~~.

2. (Currently amended) ~~A~~ The method of claim 1, wherein the method comprises the further step of ~~preparing a sample for mass spectrometry analysis, comprising~~

~~a)~~ obtaining ~~a~~ the triarylphosphonium labeling reagent having a reactive group~~;~~

~~b) obtaining a sample containing an analyte that has an exposed group and that is capable of reacting with said reactive group to thereby form a triarylphosphonium-linked analyte; and~~

~~c) reacting said labeling reagent with said analyte such that said triarylphosphonium-linked analyte is formed~~.

3. (Currently amended) The method according to claim [2] 1, wherein said labeling reagent has a structure according to the formula

$[Ar_3P^+R]X^-$

wherein

each Ar is an aryl group, all of which may the same or different;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed ~~functional~~ group to form a covalent bond thereby forming triarylphosphonium-linked analytes; and

X^- is a negatively-charged counter ion.

4. (Currently amended) A method of preparing a sample for mass spectrometry analysis, comprising

a) obtaining a sample comprising an analyte, wherein said analyte comprises an exposed group; and

b) reacting said analyte with at least two triarylphosphonium labeling reagents according to the formulae

$[Ar_3P^+R]\ X^-$

and

$[Ar^*_3P^+R]X^-$

wherein

Ar and Ar^* are aryl groups, all of which may the same or different, such that the molecular weight of Ar_3P is different from the molecular weight of Ar^*_3P;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming a triarylphosphonium-linked analyte; and

X^- is a negatively-charged counter ion;

such that ~~said~~ at least two triarylphosphonium-linked ~~analyte is~~ analytes are formed.

5. (Currently amended) ~~A~~ The method of claim 4, wherein the method comprises the further step of ~~preparing a sample for mass spectrometry analysis, comprising~~

~~a)~~ obtaining the at least two triarylphosphonium labeling reagents each having a reactive group, wherein the reactive groups of the labeling reagents are all the same~~, and the molecular weights of the triarylphosphonium groups of the labeling reagents are different from each other;~~

~~b) obtaining a sample containing an analyte that has an exposed group and that is capable of reacting with said reactive group to thereby form a triarylphosphonium-linked analyte; and~~

~~c) reacting said labeling reagents with said analyte such that said triarylphosphonium-linked analytes are formed~~.

6. (Original) The method of claim 4, wherein the difference in the molecular weights of the triarylphosphonium groups is discernable by mass spectrometry.

7. (Original) The method of claim 4, wherein the difference in the molecular weights of the triarylphosphonium-linked analytes is discernable by mass spectrometry.

8. (Original) A method of preparing a sample for mass spectrometry analysis, comprising

a) obtaining a sample comprising an analyte, wherein said analyte comprises an exposed group; and

b) reacting said analyte with at least two labeling reagents according to the formulae

$[Ar_3P^+R]X^-$

$[Ar^*_3P^+R]X^-$

[Ar**3P+R] X^-

wherein

the Ar groups (*i.e.*, Ar, Ar^*, and Ar^{**}, etc.) are aryl groups, all of which may the same or different, such that the molecular weights of the triarylphosphonium groups of each labeling reagent are unique;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming triarylphosphonium-linked analytes; and

X^- is a negatively-charged counter ion.

9. (Currently amended) A method of analyzing a sample, comprising

a) obtaining a sample comprising an analyte, wherein said analyte comprises an exposed group;

~~b)~~ forming a triarylphosphonium-linked analyte by reacting said analyte with a triarylphosphonium labeling reagent having a reactive group ~~according to the Formula~~

~~$[Ar_3P^+R]X^-$~~

~~wherein~~

~~each Ar is an aryl group, all of which may the same or different;~~

~~P is a phosphorous atom;~~

~~R is a reactive group comprising a functional group~~ that reacts with said exposed ~~functional~~ group to form a covalent bond thereby forming a triarylphosphonium-linked analyte~~;~~ ~~and~~

~~X^- is a negatively-charged counter ion~~;

such that said triarylphosphonium-linked analyte is formed; and

c) analyzing said triarylphosphonium-linked analyte by mass spectrometry.

10. (Currently amended) The ~~A~~ method of claim 9, wherein the method comprises the further step of ~~analyzing a sample, comprising~~

~~a)~~ ~~——~~obtaining ~~a~~ the triarylphosphonium labeling reagent having a reactive group~~;~~

~~b) ——obtaining a sample containing an analyte that has an exposed group and that is capable of reacting with said reactive group to thereby form a triarylphosphonium-linked analyte;~~

~~c) reacting said labeling reagent with said analyte such that said triarylphosphonium-linked analyte is formed; and~~

~~d) analyzing said triarylphosphonium-linked analyte by mass spectrometry.~~

11. (Currently amended) The method according to claim 10, wherein said labeling reagent has a structure according to the formula

$$[Ar_3P^+R]\ X^-$$

wherein

each Ar is an aryl group, all of which may the same or different;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed ~~functional~~ group to form a covalent bond thereby forming triarylphosphonium-linked analytes; and

X^- is a negatively-charged counter ion.

12. (Currently amended) A method of analyzing a sample, comprising

a) obtaining a sample comprising an analyte, wherein said analyte comprises an exposed group; and

b) reacting said analyte with at least two triarylphosphonium labeling reagents according to the formulae $[Ar_3P^+R]X^-$

and

$[Ar^*_3P^+R]X^-$

wherein

Ar and Ar^* are aryl groups, all of which may the same or different, such that the molecular weight of Ar_3P is different from the molecular weight of Ar^*_3P;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming a triarylphosphonium-linked analyte; and

X^- is a negatively-charged counter ion;

such that at least two triarylphosphonium-linked analytes are formed; and

c) analyzing said at least two triarylphosphonium-linked ~~analyte~~ analytes by a mass spectrometry technique.

13. (Currently amended) ~~A~~ The method of claim 12, wherein the method further comprises the step of ~~analyzing a sample, comprising~~

~~a) —~~obtaining the at least two triarylphosphonium labeling reagents each having a reactive group, wherein the reactive groups of the labeling reagents are all the same~~, and the molecular weights of the triarylphosphonium groups of the labeling reagents are different from each other;~~

~~b) — obtaining a sample containing an analyte that has an exposed group and that is capable of reacting with said reactive group to thereby form a triarylphosphonium-linked analyte;~~

~~c) — reacting said labeling reagents with said analyte such that said triarylphosphonium-linked analytes are formed; and~~

~~d) — analyzing said triarylphosphonium-linked analyte by a mass spectrometry technique~~.

14. (Cancelled)

15. (Currently amended) The method according to claim 9~~any of the foregoing claims~~, wherein said mass spectrometry technique is matrix-assisted laser desorption/ionization mass spectrometry or electrospray mass spectrometry.

16. (Original) The method according to claim 15, wherein said technique is quantitative.

17. (Currently amended) ~~A~~ The method of claim 13, wherein the step of reacting said analyte with at least two triarylphosphonium labeling reagents comprises~~analyzing a sample, comprising~~

~~a) obtaining at least two triarylphosphonium labeling reagents each having a reactive group, wherein the reactive groups of the labeling reagents are all the same, and the molecular weights of the triarylphosphonium groups of the labeling reagents are different from each other;~~

~~b) obtaining a sample containing an analyte that has an exposed group and that is capable of reacting with said reactive group to thereby form a triarylphosphonium-linked analyte;~~

~~c)~~ 1) reacting, in a first vessel, the first labeling reagent with a first portion of said sample such that triarylphosphonium-linked analytes thereof are formed;

~~d)~~ 2) reacting, in a second vessel, the second labeling reagent with a second portion of said sample such that triarylphosphonium-linked analytes thereof are formed; and

~~e)~~ 3) combining triarylphosphonium-linked analytes from said first vessel with triarylphosphonium-linked analytes from said second vessel to form a mixture; and

~~f)~~ wherein the step of analyzing comprises analyzing said mixture of triarylphosphonium-linked analytes by a mass spectrometry technique.

18. (Original) The method of claim 17, further comprising quantitatively comparing the relative signals of the triarylphosphonium-linked analytes from said first vessel to the triarylphosphonium-linked analytes of said second vessel.

19. – 22. (Cancelled)

23. (Original) The method according to claim 1, wherein each Ar group is selected from the group consisting of substituted or unsubstituted aryl groups.

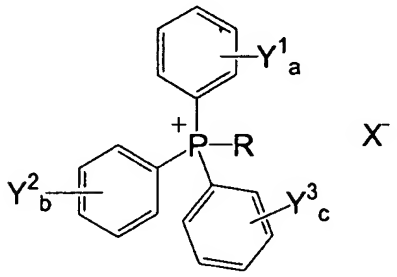
24. (Original) The method according to claim 1, wherein each Ar group is selected from the group consisting of substituted or unsubstituted heteroaryl groups.

25 – 36. (Cancelled).

37. (Original) The method according to claim 1, wherein said Ar_3P group is selected from the group consisting of substituted or unsubstituted triphenylphosphine, naphthyldiphenylphosphine, dinaphthylphenylphosphine, trinaphthylphosphine, 9-anthryldiphenylphosphine, 9-anthryldinaphthylphosphine, diphenylpyrenylphosphine, dinaphthylpyrenylphosphine.

38. – 40. (Cancelled)

41. (Original) The method according to claim 1, wherein said labeling reagent has a structure according to the formula



wherein

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming triarylphosphonium-linked analytes;

a, b, and c are independently integers from 0 to 5;

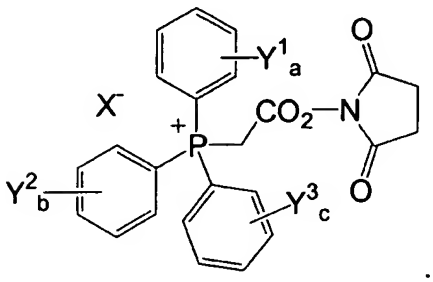
Y^1, Y^2, and Y^3, which may be the same or different, are independently selected from the group consisting of halogen, hydroxyl, alkylcarbonyloxy, arylcarbonyloxy, alkoxycarbonyloxy, aryloxycarbonyloxy, carboxylate, alkylcarbonyl, alkoxycarbonyl, aminocarbonyl, alkylthiocarbonyl, alkoxyl, phosphate, phosphonato, phosphinato, cyano, amino (including alkyl amino, dialkylamino, arylamino, diarylamino, and alkylarylamino), acylamino (including alkylcarbonylamino, arylcarbonylamino, carbamoyl and ureido), amidino, imino, sulfhydryl, alkylthio, arylthio, thiocarboxylate, sulfate, sulfonato, sulfamoyl, sulfonamido, nitro, trifluoromethyl, cyano, azido, heterocyclyl, aralkyl, aryl, and heteroyl groups, provided that none of said Y groups reacts with said R group; and

X^- is a negatively-charged counter ion.

42. (Cancelled)

43. (Cancelled)

44. (Currently amended) The method according to claim ~~1~~ 41, wherein said labeling reagent has a structure according to the formula



45. (Cancelled)

46. (Original) The method according to claim 44, wherein Y^1, Y^2, and Y^3 are selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, isobutyl, pentyl, hexyl, heptyl, methyloxy, ethyloxy, propyloxy, isopropyloxy, butyloxy, isobutyloxy, pentyloxy, hexyloxy, and heptyloxy.

47. (Cancelled)

48. (Currently amended) The method according to claim 4 ~~2~~, wherein each of said triarylphosphonium labeling ~~reagent~~ reagents has the same chemical structure, and wherein each triarylphosphonium labeling reagent is isotopically enriched with respect to the other triarylphosphonium labeling reagent ~~reagents~~.

49. (Currently amended) The method according to claim 48, wherein a triarylphosphonium labeling reagent is isotopically enriched with ^{12}C, ~~^{12}C~~ ^{13}C, ^{1}H or ^{2}H.

50. (Original) The method according to claim 41, wherein Y^1, Y^2, and Y^3 are selected from the group consisting of $O^{12}C^1H_3$, $O^{12}C^2H_3$, $O^{13}C^1H_3$, and $O^{13}C^2H_3$.

51. (Original) The method according to claim 1, wherein said exposed group of said analyte is electrophilic and said reactive functional group is nucleophilic.

52. (Original) The method according to claim 1, wherein said exposed group of said analyte is nucleophilic and said reactive functional group is electrophilic.

53. – 55. (Cancelled)

56. (Currently amended) The method according to claim ~~1~~ 3, wherein X^- is a halide, triflate, sulfate, nitrate, hydroxide, carbonate, bicarbonate, acetate, phosphate, oxalate, cyanide, aklylcarboxylate, *N*-hydroxysuccinimide , *N*-hydroxybenzotriazole, alkoxide, thioalkoxide, alkane sulfonyloxy, halogenated alkane sulfonyloxy, arylsulfonyloxy, bisulfate, oxalate, valerate, oleate, palmitate, stearate, laurate, borate, benzoate, lactate, citrate, maleate, fumarate, succinate, tartrate, naphthylate mesylate, glucoheptonate, or lactobionate.

57. (Currently amended) The method according to claim ~~1~~ 3, wherein X^- is an anionic Y group such that the labeling reagent is zwitterionic.

58. (Original) A composition comprising at least two different labeling reagents each having a different molecular weight according to the formula

$$[Ar_3P^+R]\ X^-$$

wherein

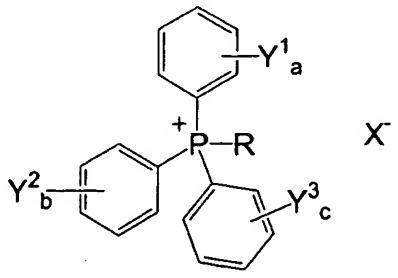
each Ar is aryl group, all of which may the same or different;

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming a triarylphosphonium-linked analyte; and

X^- is a negatively-charged counter ion.

59. (Currently amended) A composition according to claim 58 comprising at least two different labeling reagents each having a different molecular weight according to the formula



wherein

P is a phosphorous atom;

R is a reactive group comprising a functional group that reacts with said exposed functional group to form a covalent bond thereby forming triarylphosphonium-linked analytes; a, b, and c are independently integers from 0 to 5;

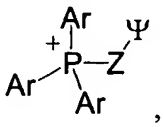
Y^1, Y^2, and Y^3, which may be the same or different, are independently selected from the group consisting of halogen, hydroxyl, alkylcarbonyloxy, arylcarbonyloxy, alkoxycarbonyloxy, aryloxycarbonyloxy, carboxylate, alkylcarbonyl, alkoxycarbonyl, aminocarbonyl, alkylthiocarbonyl, alkoxyl, phosphate, phosphonato, phosphinato, cyano, amino (including alkyl amino, dialkylamino, arylamino, diarylamino, and alkylarylamino), acylamino (including alkylcarbonylamino, arylcarbonylamino, carbamoyl and ureido), amidino, imino, sulfhydryl, alkylthio, arylthio, thiocarboxylate, sulfate, sulfonato, sulfamoyl, sulfonamido, nitro, trifluoromethyl, cyano, azido, heterocyclyl, aralkyl, aryl, and heteroyl groups, provided that none of said Y groups reacts with said R group; and

X^- is a negatively-charged counter ion.

60. (Original) The composition according to claim 59, wherein each labeling reagent has the same chemical structure, and wherein each labeling reagent is isotopically enriched with respect to the other labeling reagents.

61. – 64. (Cancelled)

65. (Currently amended) The method according to claim 1, wherein the labeling reagent has the following structure:



,

wherein

each Ar is aryl group, all of which may be the same or different;

P is a phosphorous atom;

Z is a linking group; and

Ψ is a reactive functional group.

66. (Original) The method according to claim 65, wherein said reactive functional group is an activated ester of the formula --COL, where L is a leaving group.

67. – 68. (Cancelled)

69. (Currently amended) The method according to claim 65 ~~68~~, wherein said aryl groups are unsubstituted or substituted with substituents selected from the group consisting of halogens, trifluoromethyl, nitro, cyano, C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_1-C_6 alkylcarbonyloxy, arylcarbonyloxy, C_1-C_6 alkoxycarbonyloxy, aryloxycarbonyloxy, C_1-C_6 alkylcarbonyl, C_1-C_6 alkoxycarbonyl, C_1-C_6 alkoxy, C_1-C_6 alkylthio, arylthio, heterocyclyl, aralkyl, and aromatic and heteroaromatic groups.

70. (Original) The method according to claim 65, wherein said Ψ group is a carboxylic acid, a derivative of a carboxylic acid, or an activated ester of a carboxylic acid.

71. (Original) The method according to claim 65, wherein said Ψ group is a haloalkyl, haloacetamide, halomethylbenzamide, a maleimido group, or a sulfonate ester, wherein the sulfonic acid is an alkylsulfonic acid, perfluoroalkylsulfonic acid, or an arylsulfonic acid.

72. (Original) The method according to claim 65, wherein said Ψ group is an iodoacetamide, maleimide, or a halomethylbenzamide.

73. (Original) The method according to claim 65, wherein said Ψ group is an isocyanate or an acyl nitrile.

74. – 76. (Cancelled)

77. (Original) The method according to claim 65, wherein said Ψ group is an acyl azide, an acyl nitrile, an aldehyde, an alkyl halide, an amine, an anhydride, an aniline, an aryl halide, an azide, an aziridine, a boronate, a carboxylic acid, a diazoalkane, a haloacetamide, a hydrazine, an imido ester, an isocyanate, an isothiocyanate, a maleimide, a sulfonyl halide, or a thiol group.

78. (Cancelled)

79. (Currently amended) The method according to claim 65 ~~1~~, wherein Z has 1-20 nonhydrogen atoms selected from the group consisting of C, N, O and S, and the longest linear segment contains 1-6 nonhydrogen atoms.

80. – 82. (Cancelled)

83. (Original) The method of claim 1, wherein said analyte is a protein, peptide, enzyme, immunoglobulin, hapten, antigen, amino acid, hormone, receptor, nucleic acid, hormone, chemical, polymer, pathogen, toxin, saccharide or polysaccharide, steroid, vitamin, therapeutic drug, drug of abuse, bacterium or virus, or a combination or fragment of any of the foregoing, or a metabolite thereof, or an antibody thereto.

84. (Original) The method of claim 1, wherein said analyte is a food additive, agrichemical, surfactants, adhesives, resin, organic pollutant, or process chemical.

85. (Original) The method of claim 1, wherein said analyte is a therapeutic drug or a metabolite thereof.

86. (Original) The method of claim 1, wherein said analyte is a drug of abuse or a metabolite thereof.

87. (Original) The method of claim 1, wherein said sample is rainwater, or water from an ocean, river, lake, pond, or stream.

88. (Original) The method of claim 1, wherein said sample is a biological tissue.

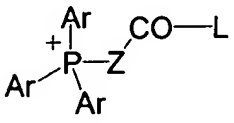
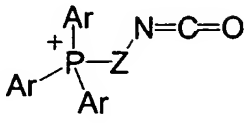
89. (Cancelled)

90. (Currently amended) A kit for use in preparing a sample for mass spectrometry analysis comprising a triarylphosphonium labeling reagent ~~according to claim 1~~ having a reactive group, and instructions for use in the method of the instant invention.

91. (Currently amended) [A] The kit ~~for use in preparing a sample for mass spectrometry analysis comprising a labeling reagent~~ according to claim [1] 90 ~~and~~ further comprising buffer chemicals.

92. (Cancelled)

93. (Currently amended) A labeling reagent having a structure selected from the group consisting of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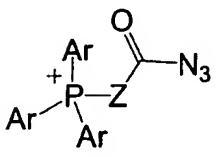
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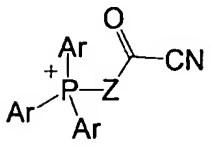
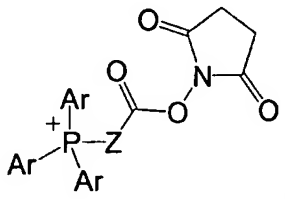
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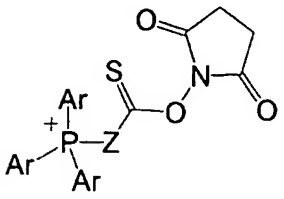
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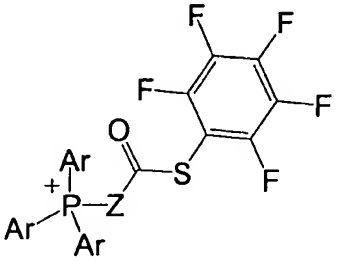
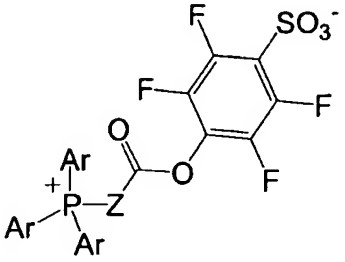
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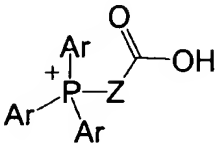
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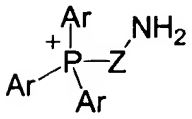
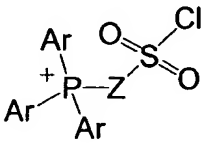
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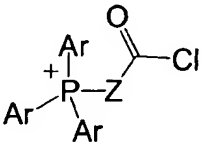
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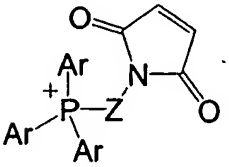
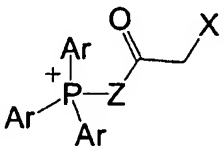
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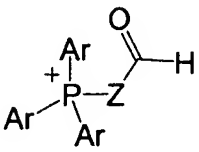
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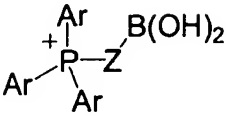
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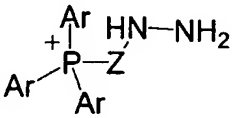
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wherein

each Ar is aryl group, all of which may the same or different;

P is a phosphorous atom;

Z is a linking group; and

L and X are, independently, ~~is a~~ leaving groups~~group~~.

94. – 98. (Cancelled)